John Z. Karlovich

Experience

Lead, Instrumentation Engineer **September 2022 - Present**
Kinetic Lethality - Shock Physics Facility (H35)
Naval Surface Warfare Center, Dahlgren Division

- Leads instrumentation, data collection, and analysis at the Shock Physics Facility. Responsible for test setup and execution of single-stage and two-stage light gas guns used in materials testing.
- Developed a computer vision-based script in Python using OpenCV to handle velocity measurements from high-speed video. The package handles video files, calculates appropriate image scale based on a selected static image, and returns the average velocity measurement captured over the relevant frames.
- Developed predictive models utilizing regression analysis to estimate a velocity based on the weight of the projectile and the pressure used to launch the projectile. Experimenting with utilizing a Random Forest model of shot data to incorporate more elements and predict outcomes.
- Leverage open-source Python libraries to perform data wrangling specific to each test series. Raw data packages are cleaned, transformed, and parsed into a standardized format ensuring an analysis-ready dataset.
- Implemented and maintain a local Git repository for all of the code utilized in video/image analysis, data aggregation, cleaning, and visualization.
- Developed efficient Python scripts to automate data ingestion, model updates, data organization, and visualization tasks, which significantly reduces the manual workload.
- Utilize SolidWorks for data-driven design and modeling of custom test fixtures in order to efficiently and accurately collect data.

Lead, Advanced Instrumentation and Analysis Group **June 2018 - September 2022**
Test and Evaluation Division (E40)
Naval Surface Warfare Center, Dahlgren Division

- Led a group of seven engineers that supports the Division by providing novel solutions to customers across the Department of Defense. Team members support efforts involving high energy lasers, insensitive munitions and performance, lethality, traditional guns, and ordnance support.
- Developed data quality standards and validation techniques for climatic test events. Led development of a software tool to automate and streamline processing of large climatic data sets. Provided input to governing body of *Department of Defense Test Method Standard: Environmental Engineering Considerations and Laboratory Tests* (MIL-STD-810).
- Led a team to establish the High Energy Laser Measurement Support (HELMS) Laboratory. Established new capabilities to support high energy laser testing both outdoors as well as in the lab. Executed multiple Naval Innovative Science and Engineering (NISE) proposals to establish base capabilities, develop the indoor lab, and develop advanced capabilities.
- Collaborated with customers, partners, and sponsors across the Department of Defense and industry. Developed relationships with partners at a multitude of test ranges and work closely with them to share information and resources.
- Provides instrumentation support for data collection at various ranges across the continental U.S. Instruments include high speed cameras, various transducers, and atmospheric measurements.

Instrumentation Engineer **June 2017 - June 2018**
Test and Evaluation Division (E40)
Naval Surface Warfare Center, Dahlgren Division

- Delivered quality controlled data products that included analysis of pressure records, displacement, velocity measurements, debris plots, high-speed and standard video.
- Responsible for understanding customer requirements, providing instrumentation guidance, and ensuring appropriate data are captured to support test requirements.
- Developed new methodology for capturing and measuring roll, pitch, and yaw of a standard fragment in flight in support of the Allied Ordnance Publication (AOP) 4496, Fragment Impact Test Procedures for Munitions.
- Trained new instrumentation engineers and technicians on best practices for collecting data products required by sponsors.

Onsite Installation Coordinator (OSIC) **April 2016 - June 2017**
Chemical, Biological, Radiological Detection and Installation (B22)
Naval Surface Warfare Center, Dahlgren Division

- Oversaw Alteration and Installation Teams (AITs) of various sizes to ensure installations were completed in accordance with all applicable standards and drawings while maintaining a safe working environment.
- Led installations of the Improved Point Detection System Life-cycle Replacement (IPDS-LR), Joint Biological Point Detection System (JBPDS), and the Joint Biological Agent Identification and Diagnostic System (JBAIDS).
- Responsible for coordinating all aspects of the installation between stakeholders while managing team to ensure installations are kept on cost and schedule.

Scientist - Research and Testing **February 2015 - April 2016**
Chemical, Biological, Radiological Detection and Installation (B22)
Naval Surface Warfare Center, Dahlgren Division

- Provided engineering support to the Family of Chemical, Biological, Radiological, and Nuclear Systems (FCBRNS) Sets, Kits, and Outfits (SKO) programs; Guardion Gas Chromatograph Mass Spectrometer (GC/MS), Dismounted Reconnaissance Sets, Kits, and Outfits (DR SKO), and the Common Analytical Laboratory System (CALS).
- Materials testing for the Joint General Purpose Decontaminant (JGPD) for Hardened Military Equipment (HME) and Joint Service Equipment Wipe (JSEW).
- Assisted with compatibility and ignitability testing of JGPD with petroleum, oils, lubricants, and fielded decontaminants.

Publications and Significant Presentations

- Evan M. Bates, John Z. Karlovich, and William L. Filkoski "Year-long atmospheric characterization effort for laser weapon testing on the Potomac River Test Range at the Naval Surface Warfare Center Dahlgren Division," Optical Engineering 61(7), 076105 (9 July 2022)
- "Data Automation and Reducing Test Reporting Time for Insensitive Munitions and Temperature Testing," E Department Technical Brief (22 May 2018).
- "USMC Fielding of the Guardian GC/MS," B Department Technical Brief (24 May 2016).

Technical Skills and Competencies

Programming & Version Control: Python, Git

Data Science Libraries & Tools: Pandas, NumPy, Matplotlib, Scikit-learn, Seaborn

Computer & Control Systems: Linux, Raspberry Pi, Arduino, Ansible, Docker

Documentation: LaTeX

Education

Virginia Polytechnic Institute and State University **Blacksburg, VA**
B.S. Biological Sciences *GPA: 3.0*